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991108 **14 May 1999 (14.05.1999)** **FI**
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(54) Title: **STANDARDIZING THE CROSS-DIRECTION THICKNESS PROFILE PRIOR TO LONG-NIP CALENDERING**

(57) Abstract: A method and an arrangement for manufacturing calendered paper or board particularly in the on-line manufacturing method. In the method, a base web is formed from a mixture of water and pulp supplied from the headbox and the web is dried by removing water over the press section and over the dryer section by heating. The formed web is calendered at least once to modify the surface on at least one of its sides. Before calendering the cross-direction thickness profile of the web is standardized and calendering is carried out by means of a long-nip calender, whereby good surface quality is obtained without losing the bulk or stiffness of the web.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00438

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: D21G 1/00, D21G 9/00, D21F 9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: D21G, D21F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9844195 A1 (VALMET CORPORATION), 8 October 1998 (08.10.98), page 1, line 6 - line 11; page 7, line 20 - line 22; page 11, line 24 - line 28, page 12, line 7 - line 9; figure 4 --	1,2,9,10, 13-16,18,19, 26,27,30-33
X	EP 0826821 A2 (VOITH SULZER PAPIERMASCHINEN GESELLSCHAFT MBH), 4 March 1998 (04.03.98), figures, claims --	1,2,13,14, 18,19,30,31
A	WO 9832916 A1 (VALMET CORPORATION), 30 July 1998 (30.07.98), page 2, line 16 - page 3, line 2; page 7, line 30 - page 8, line 14, claims 1,2, abstract --	1,2,13,14, 18,19,30,31

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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10 -11- 2000

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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9534715 A1 (ALBANY NORDISKAFILT AB), 21 December 1995 (21.12.95), page 2, line 5 - line 25 --	1,2,13-16, 18,19,30-33
A	US 5658432 A (EDWIN MICHAEL HEAVEN ET AL), 19 August 1997 (19.08.97) -- -----	1,2,13-16, 18,19,30-33

INTERNATIONAL SEARCH REPORT

International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: **17 and 34**
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See extra sheet.
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: **See extra sheet.**

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

Cont. of Box I, 2.

Present claims 17 and 34 relate to a large number of possible methods or arrangements. in fact, the claim contains so many options that a lack of clarity and conciseness within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of the claims 17 and 34 impossible.

Cont. of Box II, 4.

I: 1,2,18,19,13-16,30-33

Cont. of Box II:

- I. The independent claims 1 and 18 relate to a method and an arrangement for standardizing the cross-direction thickness profile prior to long-nip calendering. The dependent claims 2 and 19 relate to standardizing the thickness profile, the caliper, by profiled diluting in the headbox.
- II. Claims 3 and 20 relate to standardizing the thickness profile by steaming during pressing.
- III. Claims 4 and 21 relate to standardizing the thickness profile by pressing the web.
- IV. Claims 5 and 22 relate to standardizing the thickness profile by heating the web.
- V. Claims 6 and 23 relate to standardizing the thickness profile by cooling the web.
- VI. Claims 7-8 and 24-25 relate to standardizing the thickness profile by wetting the web.
- VII. Claims 9-10 and 26-27 relate to standardizing the thickness profile by machine calendering prior to calendering.
- VIII. Claims 11-12 and 28-29 relate to precalendering followed by coating and further calendering with a long-nip calender.
- IX. Claims 13-14 and 30-31 relate to measuring the thickness profile.
- X. Claims 15 and 32 relate to the web being taken directly to the long-nip calender.
- XI. Claims 16 and 33 relate to winding of the web before calendering.

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INTERNATIONAL SEARCH REPORT

International application No.
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The independent claims do not avoid the prior art, see document WO 9844195 in the partial international search, form PCT/ISA/206. The special technical feature of Group II is to standardize through steaming during pressing. The special technical feature of Group III is to standardize through pressing the web. The special technical feature of Group IV is to standardize through heating the web. The special technical feature of Group V is to standardize through cooling the web. The special technical feature of Group VI is to standardize through wetting the web. The special technical feature of Group VII is to standardize through machine calender prior to calendering. The special technical feature of Group VIII involves precalendering, coating, and finally calendering the web with a long-nip calender. The special technical feature of Group IX is to measure the thickness profile. The special technical feature of Group X is to directly taking the web to the long-nip calender. The special technical feature of Group XI is to wind the web onto a storage roll prior to long-nip calendering. There is no technical relationship left over the prior art among the claimed inventions that involves a corresponding special technical feature and the dependent claims mentioned in Groups II-XI are therefore left without a single general inventive concept. The lack of unity of invention is thus found "a posteriori" and the group of inventions is not so linked as to form a single inventive concept under PCT Rule 13.

However, the Groups IX-XI include such features over the prior art that is clearly obvious to a person skilled in the art and the search examiner has therefore been able to make a complete international search for the inventions covered by the Groups IX-XI with negligible additional work.

INTERNATIONAL SEARCH REPORT

Information on patent family members.

03/10/00

International application No.

PCT/FI 00/00438

WO	9844195	A1	08/10/98	AU	6503698	A	22/10/98
				EP	0973971	A	26/01/00
				FI	102304	B	00/00/00
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				DE	19634997	A,C	05/03/98
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WO	9832916	A1	30/07/98	AU	5665198	A	18/08/98
				BR	9807110	A	25/04/00
				CN	1244225	T	09/02/00
				EP	0970277	A	12/01/00
				FI	3083	U	30/09/97
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				FI	970294	D,V	16/06/97
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				BR	9508701	A	12/08/97
				CN	1150830	A	28/05/97
				DE	69512239	D,T	23/03/00
				EP	0767851	A,B	16/04/97
				ES	2135746	T	01/11/99
				FI	964973	A	12/12/96
				JP	10501852	T	17/02/98
				NO	308319	B	28/08/00
				NO	965266	A	16/12/96
				NZ	288369	A	19/12/97
				SE	502960	C	26/02/96
				SE	9402094	A	16/12/95
				US	5836242	A	17/11/98
				ZA	9504985	A	14/02/96
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US	5658432	A	19/08/97	NONE			
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